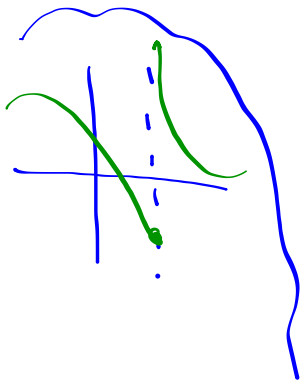
day 10

Yesterday we learned that

$$\lim \frac{\text{Really Not Zero}}{\text{Zero-ish}} = \begin{cases} +\infty \\ -\infty \\ \text{DNE} \end{cases}$$

So GENERALLY SPEAKING and IN A VERY NON PRECISE WAY



$$\frac{1}{0^{**}} = \infty^{*}$$

vertical asymptote idea

day 10

about division

$\frac{12}{4} = 3$ because***

$3 \cdot 4 = 12$

$\frac{12}{3} = 4$

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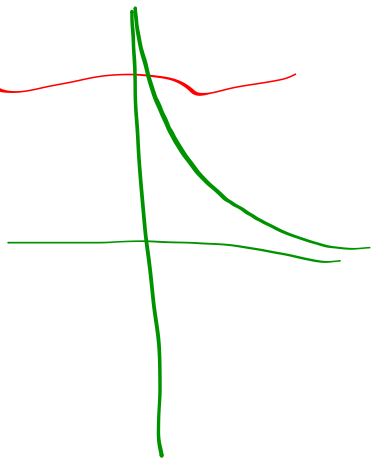
gen. sp. in a not very precise way

PI of 2.5

$\frac{1}{\infty^*} = 0^{**}$

horizontal asymptote

$\lim_{x \to \pm\infty} \frac{1}{x} = 0^{+/-}$



$\frac{1}{1}, \frac{1}{10}, \frac{1}{100}, \frac{1}{1000}, \ldots$

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2.5/9

$$\lim_{x\to\infty} 3 + \lim_{x\to\infty} \frac{10}{x^2} = 3$$

/10

$$\lim_{x\to\infty} \left(5 + \frac{1}{x} + \frac{10}{x^2}\right) = 5$$

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If $\lim_{x \to +\infty \text{ or } -\infty} f(x) = L$

then $y = L$ is a horizontal asymptote of $f(x)$

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2.5/25 $f(x) = \frac{4x}{20x+1}$

$\lim_{x\to\infty} \frac{4x}{20x+1}$

$= \lim_{x\to\infty} \frac{x(4)}{x(20+\frac{1}{x})}$

$= \lim_{x\to\infty} \frac{4}{20+\frac{1}{x}}$

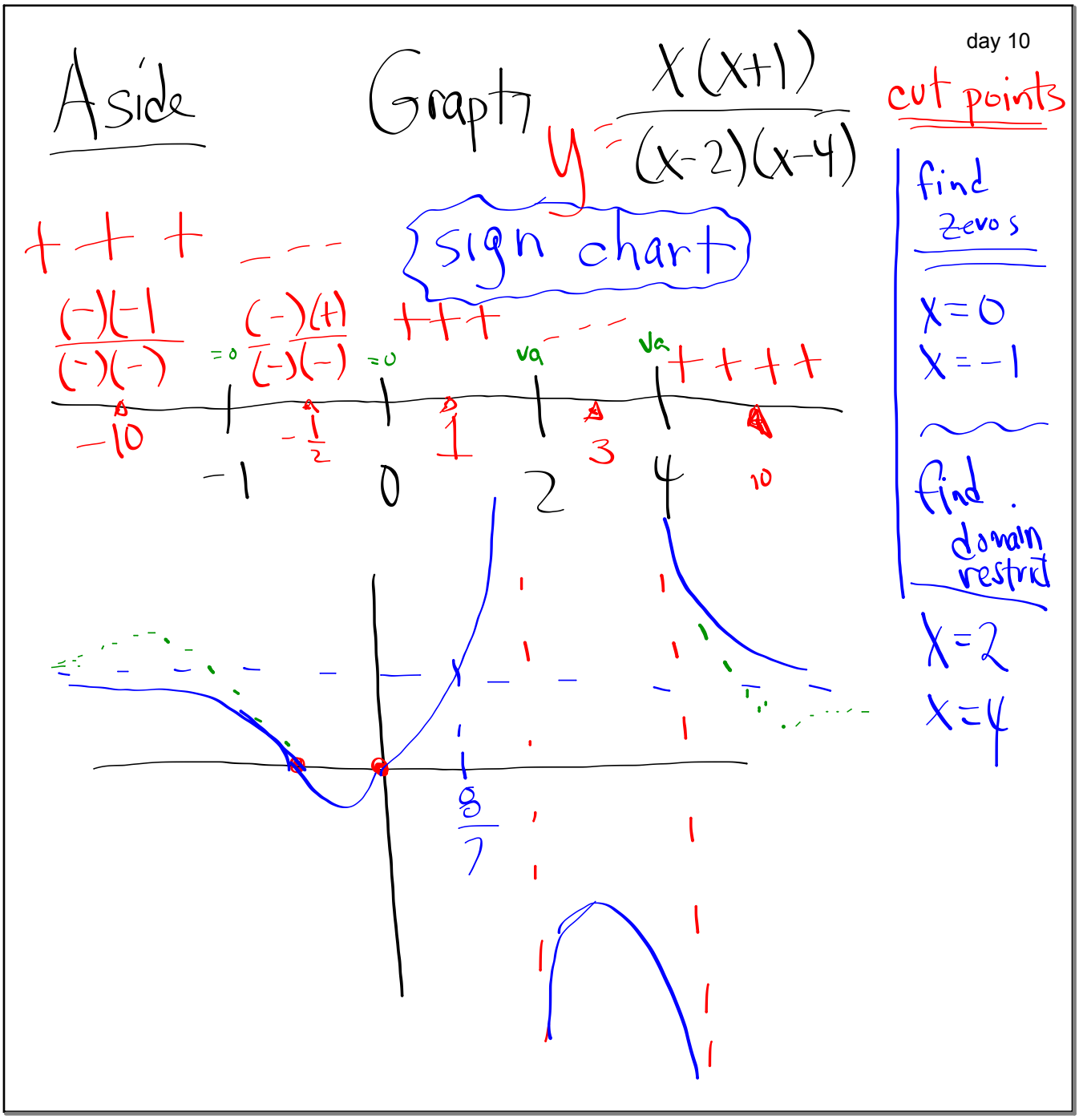
$= \frac{4}{20+0} = \frac{1}{5}$

"$\frac{\infty}{\infty}$" indeterminate form just like "$\frac{0}{0}$" IDK

$\lim_{x\to-\infty} \frac{4x}{20x+1}$

$\lim_{x\to-\infty} \frac{x(4)}{x(20+\frac{1}{x})}$

$= -\lim_{x\to-\infty} \frac{4}{20+\frac{1}{x}} = \frac{1}{5}$


Aside
Graph
$y = \frac{x(x+1)}{(x-2)(x-4)}$
day 10
cut points
find zeros
x = 0
x = -1
find domain restrict
x = 2
x = 4
sign chart
+ + +
- - -
+++
+ + + +
VA
VA
-10
-1
-1/2
0
1
2
3
4
10
9/7

day 10

$$\lim_{x\to\infty} \frac{x(x+1)}{(x-2)(x-4)} = \lim_{x\to\infty} \frac{x^2(1)\left(1+\frac{1}{x}\right)}{x^2\left(1-\frac{2}{x}\right)\left(1-\frac{4}{x}\right)}$$

$$= \lim_{x\to\infty} \frac{1\left(1+\frac{1}{x}\right)}{\left(1-\frac{2}{x}\right)\left(1-\frac{4}{x}\right)}$$

Where does fn cross HA?

$$1 = \frac{x(x+1)}{(x-2)(x-4)}$$

$$x^2-6x+8 = x^2+x$$

$$0 = 7x-8 \qquad x = \frac{8}{7}$$

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2.5/39)

recall

$a^m a^n = a^{m+n}$

$\frac{a^m}{a^n} = a^{m-n}$

$a^0 = 1$

$a^1 = a$

$(ab)^m = a^m b^m$

$a^{-m} = \frac{1}{a^m}$

$a^{\frac{1}{n}} = \sqrt[n]{a}$

$f(x) = -3e^{-x} = \frac{-3}{e^x}$

$\lim_{x\to\infty} \frac{-3}{e^x} = 0$

40

$\lim_{x\to\infty} 2^x = \infty$

$\lim_{x\to-\infty} 2^x = 0!$

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due for Thursday

2.4/46-47,50,57

2.5/45-48,70-73,75

for Friday

2.5/42-43,35-36

for Mon

2.4/35-38

2.3/77-78,83

2.6/1-6,9-14

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2.5

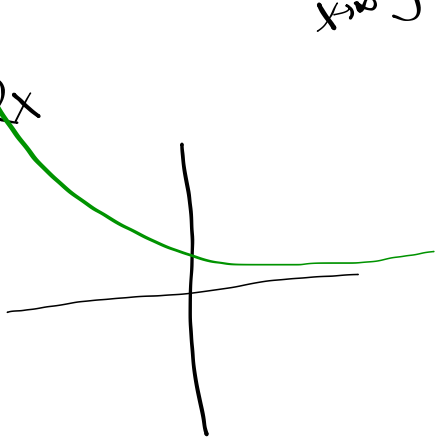
3) $\lim_{x\to\infty} \frac{f(x)}{g(x)} = 0$

we know

$\lim_{x\to\infty} f(x) = 100{,}000$

$\lim_{x\to\infty} g(x) = \infty$

4) $g(x) = e^{-2x}$



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